What the Experts Say About Climate Change

How do the experts know that the climate is changing? And who are these experts, anyway?

In 1988 the United Nations' Environment Programme and the World Meteorological Organization established the Intergovernmental Panel on Climate Change (IPCC), bringing together about 2,000 independent leading scientists from around the world. The scientists were asked to assess the available scientific information on climate change and to formulate realistic strategies to respond to the problem.

According to the 1995 IPCC report, the evidence that the climate is changing includes the facts that:

- Global mean surface air temperature has increased between 0.5 and 1.1 degrees Fahrenheit since the late 19th century.
- Recent years have been among the warmest this century.

Other evidence is based on melting glaciers, sea level rise, and computer models. Also, recent studies indicate that in the northern hemisphere, Spring is arriving sooner and Fall later. One of the major conclusions of the IPCC in 1995 is that "The balance of evidence suggests a discernable human influence on global climate." In other words, when we look at all of the evidence, it tells us that there is a strong likelihood that humans are affecting climate.

Melting Glaciers

In many areas around the world, glaciers are melting and retreating; a few experts believe this is an indicator of climate change. Researchers with the U.S. Geological Survey have compiled research indicating that the large glaciers at Montana's Glacier National Park are now approximately one-third the size they were in 1850. Climate reports at the park dating back to 1900 show a correlation between rates of glacial retreat and the regional climate.

Sea Level Rise

Sea level already has risen worldwide approximately 6-8 inches during the last century. Approximately 1-2 inches of the rise have resulted from the melting of mountain glaciers. Another 0.7-2.8 inches have resulted from the expansion of ocean water that comes from warmer ocean temperatures.

Climate Models

The behavior of the climate system can be simulated with computer models called general circulation models (GCMs). GCMs are computer representations of global climate that are used to make climate change predictions.

GCM simulations can be used to study the response of the climate to changing amounts of greenhouse gases, aerosols, and other changes. Aerosols are minute particles suspended in the atmosphere. Some are naturally occurring (e.g., desert dust), and others are caused by human activity (e.g., sulfate aerosols).

It is important to understand that climate modeling results in broad projections, rather than precise predictions. However, once a climate model has been tested against current and past observations, it is reasonable to consider what it can tell us about future climates.

According to the Intergovernmental Panel on Climate Change, the latest climate models indicate that the earth will warm 1.8 to 6.3 degrees Fahrenheit by the year 2100, with a best estimate of 3.6 degrees Fahrenheit. This range reflects our understanding of how the climate would respond to a doubling of carbon dioxide above preindustrial levels and a range of possible future trends in greenhouse gas emissions.

NOAA/NASA/EPA CLIMATE CHANGE PARTNERSHIP